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THE GROWTH OF CITIES AND THEIR INDEBTEDNESS FOR SCHOOLS

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The Division of Statistics of the Russell Sage Foundation is engaged in a study of the indebtedness of American city school systems. In the course of the study evidence has been secured as to the relationship between school debts and the rate at which cities are increasing in population. This evidence will be summarized and analyzed in the present article.

The rapidity of a city's growth is often put forward as a reason for increasing its school debt or as an explanation of a large indebtedness already existing. It is asserted that the extensive building operations made necessary by a large increase in school population usually cannot be paid for from current revenue. The validity of this reasoning may be tested by an examination of the statistics. An attempt has therefore been made to answer the question: Is indebtedness largest, in general, in the cities which have grown most rapidly in population, and smallest in those which have grown least rapidly?

Statistics as to the indebtedness of cities of 30,000 or more population are found in the census report "Financial Statistics of Cities" for 1915, while the census for 1910 gives information as to the rates of increase of the population of these cities from 1900 to 1910.[1] As the cities differ widely in size and in wealth, total indebtedness is not significant for the purposes of the present study. It is necessary, in order to obtain comparable figures, to state indebtedness in terms of the burden which it imposes upon ability to pay taxes, and this has been done by computing for the different cities indebtedness per inhabitant.

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[1] No attempt has been made to show movement of population subsequent to 1910, for the reason that all population figures for more recent years are estimates based on the returns of the censuses of 1910 and 1900.

The distribution of these cities according to indebtedness per inhabitant is shown in Fig. 1. The range of the distribution extends from nothing up to between $30.00 and $35.00. The average indebtedness per inhabitant is $9.72, and the standard deviation, computed from the average, is $6.60, or 68 per cent of the average. It will be noted that the distribution is skewed—that the cities cluster at the lower end of the scale.

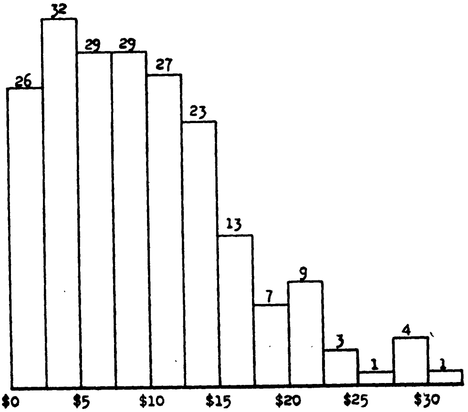

FIG. 1.—Distribution of 204 cities according to school indebtedness per inhabitant. Each column represents a group of cities. All the cities in the left-hand column have per capita school debts of less than $2.50; the city in the right-hand column has indebtedness of between $30.00 and $32.50. The heights of the columns are proportionate to the number of cities represented.

In Fig. 2, which, like Fig. 1, is based upon per capita indebtedness, the names of the cities are given. The cities are arranged in columns. All the cities in the left-hand column owe less than $5.00 per inhabitant, and the city in the column at the extreme right owes between $30.00 and $35.00. In each column the cities are arranged from top to bottom in descending order of indebtedness; Chester, for example, at the head of the second column, has a much larger per capita indebtedness than East St. Louis, at the foot of the same column. By means of this diagram a reader interested in any given city can compare its indebtedness with that of any other city, and can ascertain its position in the group.

Fig. 3 shows the distribution of the cities according to rate of increase in population from 1900 to 1910. The curiously distorted appearance of this diagram is mainly due to the large increase reported for two cities—Oklahoma City and Muskogee, Oklahoma. The average rate of increase is 54.9 per cent, and the standard deviation, computed from the average, is 65.7 per cent. It will be noted that the standard deviation is greater than the average.

Less than $5	$5 and less than $10	$10 and less than $15	$15 and less than $20	$20 and less than $25	$25 and less than $30	$30 and less than $35
Lowell	Chester	McKeesport	Oakland	Yonkers	Hartford	Mt. Vernon
Reading	Scranton	Akron	Muskogee	Atlantic City	East Orange	
Bridgeport	Tacoma	Salt Lake City	San Diego	Kansas City, Mo.	Newton	
San Antonio	Altoona	Huntington	Orange	Newark	Springfield, Mass.	
Malden	Fall River	Lorain	St. Joseph	Boston	Bayonne	
Charlotte	Lincoln	Los Angeles	Fresno	Oklahoma City		
Oshkosh	Camden	Spokane	Minneapolis	New Rochelle		
Little Rock	Pueblo	Detroit	Des Moines	Schenectady		
Peoria	Sioux City	Duluth	Hoboken	Berkeley		
Terre Haute	Cleveland	Colorado Springs	Passaic	Pasadena		
Knoxville	Lancaster	Norristown	Perth Amboy	New York		
Elmira	Fort Wayne	Waterbury	Harrisburg	Waco		
Chattanooga	Aurora	Boise	Chelsea			
New Orleans	St. Paul	San Francisco	Dallas			
Nashville	Quincy, Mass.	El Paso	Hamilton			
Rochester	Springfield, O.	Jamestown	Elizabeth			
Amsterdam	South Bend	Wilkes-Barre	Seattle			
Tampa	Kansas City, Kans.	Binghamton	Buffalo			
Louisville	La Crosse	Cincinnati	Pittsburgh			
Jackson	Johnstown	Holyoke	Pittsfield			
Dubuque	Taunton	Houston				
Wheeling	Wichita	Haverhill				
Lexington	Grand Rapids	Albany				
Portsmouth	Montgomery	Everett, Wash.				
Butte	Troy	Cambridge				
Quincy, Ill.	Waterloo	Jersey City				
Shreveport	Philadelphia	Richmond				
Lawrence	Williamsport	West Hoboken				
Norfolk	Fort Worth	Toledo				
Atlanta	Utica	New Britain				
Portland, Ore.	Salem	Allentown				
Mobile	Danville	Paterson				
Newport	Erie	Niagara Falls				
Roanoke	Racine	Sacramento				
Springfield, Ill.	Lima	San Jose				
Woonsocket	Decatur	Canton				
Bay City	Lynchburg	Trenton				
Rockford	New Castle	Cedar Rapids				
Manchester	Milwaukee	Kalamazoo				
Wilmington	Flint	Topeka				
Covington	Auburn	Omaha				
Lansing	Fitchburg	New Bedford				
Portland, Me.	Austin	Lynn				
Columbia	Bellingham	Memphis				
Springfield, Mo.	Galveston	Providence				
Evansville	Birmingham	Everett, Mass.				
Denver	York	Superior				
Saginaw	Council Bluffs	Brockton				
Joliet	Columbus	Youngstown				
Charleston	Pawtucket	Worcester				
Savannah	Davenport					
Chicago	Joplin					
Augusta	New Haven					
Jacksonville	Syracuse					
Macon	Indianapolis					
Somerville	Baltimore					
St. Louis	Dayton					
Washington	East St. Louis					

FIG. 2.—Distribution of 204 cities according to indebtedness, with names of cities. In each column the cities are arranged in descending order of indebtedness per inhabitant; the city appearing at the top of the column has a larger indebtedness than that at the bottom.

This is due, in part, to the fact that the populations of several cities decreased.

Indebtedness per inhabitant has been related to the rate of increase in population by computing a Pearsonian coefficient of correlation. The result obtained is +0.26. The reliability of this coefficient is affected by the number of cities included in the comparison. This factor has been taken into account by computing

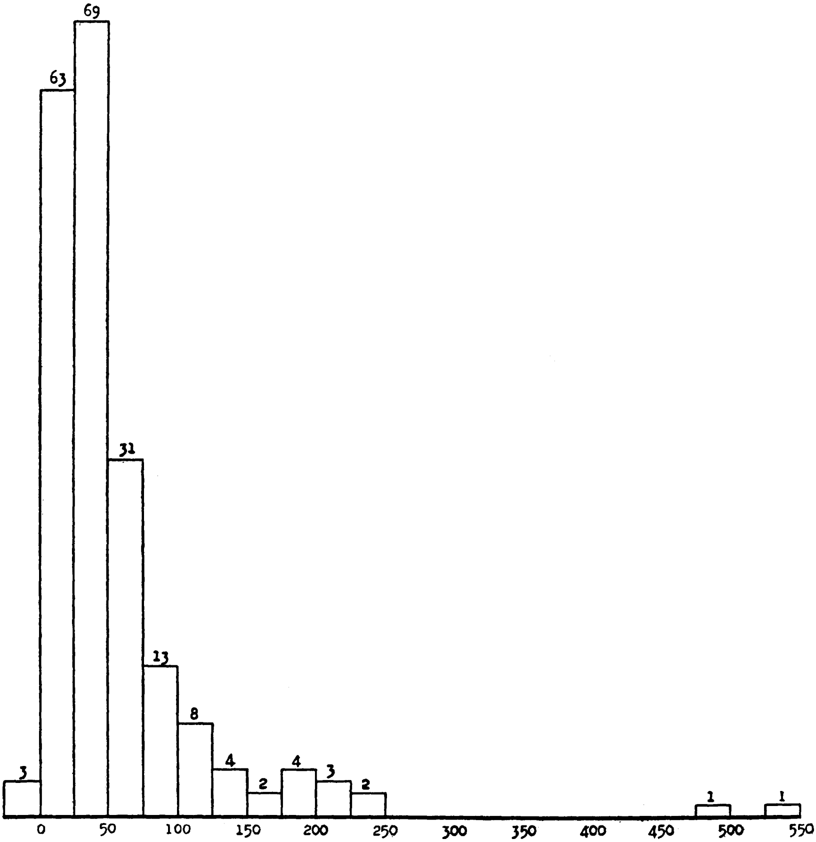

FIG. 3.—Distribution of 204 cities according to percentage of increase or decrease in population from 1900 to 1910. Each column represents a group of cities. All the cities in the left-hand column decreased in population by less than 25 per cent; those in the second column increased by less than 25 per cent; and the city in the column at the extreme right increased by between 525 per cent and 550 per cent. The heights of the columns are proportionate to the number of cities represented.

the probable error of the coefficient, which is found to be 0.044. Computations based upon the probable error and the coefficient indicate that the chances are even that the true coefficient lies between +0.21 and +0.30, and a further computation shows that the chances are more than two to one that it does not fall below +0.19 nor exceed +0.32. There is, then, a slight positive correlation between indebtedness and rapidity of growth.

It is clear that the cities that have grown most rapidly have, in general, a larger indebtedness than the cities that have grown less rapidly, but that the relationship is not at all close.

The evidence presented in this article bears directly upon the validity of the theory that rapid growth is a reason and an excuse for large school indebtedness. While the statistics show that the more rapid advances in population are accompanied, rather more frequently than not, by large debts, the correspondence is seen to be slight. This means that very many cities have grown rapidly without having been forced to incur debts of exceptional magnitude. And if such a result is possible for many cities, it is doubtless possible for others. Rapidity of growth is not, then, an unanswerable argument for an increase in indebtedness. The policy to be adopted in any individual case must depend upon whether the community is willing to make necessary expenditures from current revenues in order to avoid imposing a burden of indebtedness upon future taxpayers.